

SUPPLEMENTARY NOTES ON THE FEEDING OF DACETINE ANTS.

By WILLIAM L. BROWN, JR., Cambridge, Mass.

Mr. E. O. Wilson, Jr. has described in another part of this issue the feeding of *Strumigenys* (*s. str.*) *louisianae* Roger upon Collembola. Entomobryidae (*s. lat.*) and Isotomidae were accepted, and the former were preferred. Hypogastruridae and Neanurinae were rejected. Wilson's is the first fully documented report of *Strumigenys* (as I have restricted the genus) feeding upon Collembola. The classical observations of the Wessons (1936, 1939) and all subsequent recorded instances of Collembolans being preyed upon by dacetines were made upon ants now included in *Smithistruma* Brown.

A very brief observation was recorded by Weber (1939), in which that author recorded a *Strumigenys* worker carrying a dead collembolan in its jaws. There was nothing in this note to indicate whether the ant belonged to *Strumigenys* or to *Smithistruma* as now known. The springtail was identified as *Entomobrya* sp. by Mills. Dr. Weber has recently traced both the specimen and his notes in his very full records from his South American collecting tours. The dacetine seen to be carrying the dead specimen of *Entomobrya* was taken by Dr. Weber in the interior of British Guiana; this has been sent to me and proves to be *Strumigenys* (*Strumigenys*) *elongata* Roger, a very common Neotropical dacetine.

On the basis of this observation and those accumulated by the Wessons (1936, 1939), Jones and Pfitzer (*mss.* and *in lit.*), Brown (*mss.*), etc., it seems evident that the habit of preying upon Collembola is basic and widespread among the higher dacetine ants. *Strumigenys* and *Smithistruma* are the two largest genera in the tribe Dacetini, and form the bulk of the worldwide-distributed *Strumigenys* complex. The peculiar bizarre pilosity and spongi-form appendages of the pedicel and adjacent parts of the body displayed by the members of this complex are possibly connected with a secretory apparatus which may produce the granular substance so commonly fouling the surfaces of the integument. This apparatus may well act as a lure for Collembola, many of which feed upon fungi. Many of the hairs on dacetine species are good copies of hyphae, fruiting bodies, etc., and in view of the preference observed in many springtails for well-moulded insect remains, it may

be hypothesized that some collembolans are drawn toward the head and jaws of the dacetines by olfactory, tactual and possibly even visual lures in a few cases, although the eyes of *Collembola* are very poorly developed at best. It is certainly of some significance that the pilosity is usually most bizarrely developed on the clypeus, nearest the jaws, and that the ants are extremely sedentary huntresses compared to most predaceous ants which have been studied.

All of these possibilities require testing by experimentation. The greatest difficulty to be overcome lies in the extremely small size of the ants which have been investigated up to the present; larger species of *Strumigenys* like *mandibularis* Fred. Smith and *nidifex* Mann will probably prove better subjects for observation.

The almost instantaneous immobilization of the prey when struck by the dacetines may be due, as is suggested by the recorded observations of Creighton (1937), to some toxic principle employed by the ants at the time of striking. The curious paired labral lobes, appearing like small extended nozzles between the mandibular bases of all *Strumigenys* complex species, would probably be the best structures to investigate for solution of this problem.

Meanwhile, the observations of Mr. Wilson and some of my own made upon *Smithistruma rostrata* (Emery) strongly suggest the following generalization: collembolan species having well developed springing apparatus (furcula) are preferred as prey, while those in which the furcula is lacking or poorly developed are either rarely taken or rejected. When I flooded my colony, established in a small artificial nest, with several hundred live *Anurida maritima*, the common springless seaside collembolan, those individuals which entered the *rostrata* nest accidentally were forcibly ejected by the ants. Some were stung by the ants and killed, but none was eaten. Numerous specimens of *Onychiurus armatus* Tullberg flourished on a heavily moulded substrate of beetle larvae remains, feeding voraciously on the white filamentous hyphal strands, but none were ever molested by any *Smithistruma* workers, even those which came into direct contact with them. In my observation nest, the *rostrata* workers preferred Entomobryidae (*sensu lato*) above all other types of *Collembola* offered them.

Mr. Wilson's observations upon *S. louisianac* wherein termites were taken require further attention, especially since so many tropical dacetines are taken often in termitaries. The possibility exists that many other groups of ants having bizarre mandibles or pilosity or both together may feed on *Collembola* or on some other fungiphilous arthropods (*Myrmica*, *Creightonidris*, *Octostruma*, *Calypptomyrax*, etc.).

I hope to investigate the three other major lines in the dacetines in addition to the *Strumigenys* complex. Some of the members of these more primitive lines are so large that observation of the means of foodgetting should prove easy. The feeding of *Orectognathus*, *Daceton* and members of the *Epopostruma* complex should show some indications of the mode of origin of the complex food relationship characteristic of the higher dacetines.

I wish to congratulate Mr. Wilson on his significant addition to the knowledge of dacetine ethology, and I know that work which he is now beginning with several genera will shed new light on the problem. I also wish to thank Mr. Kenneth Christiansen, who has determined all the collembolans and who has contributed in a major way to formulating ideas of prey selectivity here put forward. Credit is also due Lt. Joseph W. Jones, Jr., who has sent me the colony of *Smithistruma rostrata* mentioned above from north of Newport News, Virginia. I have had this colony under observation for over one year.

REFERENCES CITED

- Creighton, W. S. 1937. *Psyche*, XLIV, pp. 97-109, fig. 1.
Weber, N. A. 1939. *Ann. Ent. Soc. Amer.*, XXXII, pp. 98-99.
Wesson, L. G., Jr. 1936. *Ent. News*, XLVII, pp. 171-174.
Wesson, L. G., Jr. and R. G. Wesson 1939. *Psyche*, XLVI, pp. 91-112, Pl. 3.

Two aphid records: Interesting aphid records recently called to my attention by Professor M. A. Palmer when she examined some of my unidentified aphid slides, included: *Vacuna (Thelaxes) californica* Davidson, which I collected on *Quercus gambelii* above Thistle and at Castle Gate in Utah, June 9, 1946. A still more interesting find was a slide of *Panaphis (Callipterus) juglandis* (Goetz), collected by my former student, D. L. Bischoff, on walnut at Hazeldeh, Washington, July 5, 1945. G. F. KNOWLTON, Logan, Utah.